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**Information technology — UPnP  
Device Architecture —**

**Part 20-13:  
Audio video device control protocol —  
Level 4 — Rendering control service**

*Technologies de l'information — Architecture de dispositif UPnP —*

*Partie 20-13: Protocole de contrôle de dispositif audio-vidéo —  
Niveau 4 — Service de contrôle de rendu*





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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see <http://www.iso.org/directives>).

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For an explanation on the voluntary nature of Standard, the meaning of the ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword – Supplementary information](#)

ISO/IEC 29341-20-13 was prepared by UPnP Forum and adopted, under the PAS procedure, by joint technical committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

The list of all currently available parts of ISO/IEC 29341 series, under the general title *Information technology — UPnP Device Architecture*, can be found on the [ISO web site](#).

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## Original UPnP Document

Reference may be made in this document to original UPnP documents. These references are retained in order to maintain consistency between the specifications as published by ISO/IEC and by UPnP Implementers Corporation and later by UPnP Forum. The following table indicates the original UPnP document titles and the corresponding part of ISO/IEC 29341:

| <b>UPnP Document Title</b>                      | <b>ISO/IEC 29341 Part</b> |
|-------------------------------------------------|---------------------------|
| UPnP Device Architecture 1.0                    | ISO/IEC 29341-1:2008      |
| UPnP Device Architecture Version 1.0            | ISO/IEC 29341-1:2011      |
| UPnP Device Architecture 1.1                    | ISO/IEC 29341-1-1:2011    |
| UPnP Device Architecture 2.0                    | ISO/IEC 29341-1-2         |
| UPnP Basic:1 Device                             | ISO/IEC 29341-2           |
| UPnP AV Architecture:1                          | ISO/IEC 29341-3-1:2008    |
| UPnP AV Architecture:1                          | ISO/IEC 29341-3-1:2011    |
| UPnP AVTransport:1 Service                      | ISO/IEC 29341-3-10        |
| UPnP ConnectionManager:1 Service                | ISO/IEC 29341-3-11        |
| UPnP ContentDirectory:1 Service                 | ISO/IEC 29341-3-12        |
| UPnP RenderingControl:1 Service                 | ISO/IEC 29341-3-13        |
| UPnP MediaRenderer:1 Device                     | ISO/IEC 29341-3-2         |
| UPnP MediaRenderer:2 Device                     | ISO/IEC 29341-3-2:2011    |
| UPnP MediaServer:1 Device                       | ISO/IEC 29341-3-3         |
| UPnP AVTransport:2 Service                      | ISO/IEC 29341-4-10:2008   |
| UPnP AVTransport:2 Service                      | ISO/IEC 29341-4-10:2011   |
| UPnP ConnectionManager:2 Service                | ISO/IEC 29341-4-11:2008   |
| UPnP ConnectionManager:2 Service                | ISO/IEC 29341-4-11:2011   |
| UPnP ContentDirectory:2 Service                 | ISO/IEC 29341-4-12        |
| UPnP RenderingControl:2 Service                 | ISO/IEC 29341-4-13:2008   |
| UPnP RenderingControl:2 Service                 | ISO/IEC 29341-4-13:2011   |
| UPnP ScheduledRecording:1                       | ISO/IEC 29341-4-14        |
| UPnP ScheduledRecording:2                       | ISO/IEC 29341-4-14:2011   |
| UPnP MediaRenderer:2 Device                     | ISO/IEC 29341-4-2         |
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| UPnP AV Datastructure Template:1                | ISO/IEC 29341-4-4:2008    |
| UPnP AV Datastructure Template:1                | ISO/IEC 29341-4-4:2011    |
| UPnP DigitalSecurityCamera:1 Device             | ISO/IEC 29341-5-1         |
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| UPnP HVAC_System:1 Device                       | ISO/IEC 29341-6-1         |
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| UPnP DimmableLight:1 Device             | ISO/IEC 29341-7-2        |
| UPnP InternetGatewayDevice:1 Device     | ISO/IEC 29341-8-1        |
| UPnP LANHostConfigManagement:1 Service  | ISO/IEC 29341-8-10       |
| UPnP Layer3Forwarding:1 Service         | ISO/IEC 29341-8-11       |
| UPnP LinkAuthentication:1 Service       | ISO/IEC 29341-8-12       |
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| UPnP WANCableLinkConfig:1 Service       | ISO/IEC 29341-8-14       |
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| UPnP QosManager:1 Service               | ISO/IEC 29341-10-11      |
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| UPnP QosManager:2 Service               | ISO/IEC 29341-11-11      |
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| UPnP ContentDirectory:3 Service         | ISO/IEC 29341-14-12:2011 |
| UPnP MediaServer:3 Device               | ISO/IEC 29341-14-3:2011  |
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| UPnP QoS Architecture:3                                 | ISO/IEC 29341-17-1:2011  |
| UPnP QoSDevice:3 Service                                | ISO/IEC 29341-17-10:2011 |
| UPnP QoSManager:3 Service                               | ISO/IEC 29341-17-11:2011 |
| UPnP QoSPolicyHolder:3 Service                          | ISO/IEC 29341-17-12:2011 |
| UPnP QoSDevice:3 Addendum                               | ISO/IEC 29341-17-13:2011 |
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| UPnP InboundConnectionConfig:1 Service                  | ISO/IEC 29341-18-10:2011 |
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| UPnP RADASync:1 Service                                 | ISO/IEC 29341-18-12:2011 |
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| UPnP RAClient:1 Device                                  | ISO/IEC 29341-18-2:2011  |
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| UPnP SolarProtectionBlind:1 Device                      | ISO/IEC 29341-19-1:2011  |
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| UPnP ContentDirectory:4 Device                          | ISO/IEC 29341-20-12      |
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| UPnP MediaServer:4 Device                               | ISO/IEC 29341-20-3       |
| UPnP AV Datastructure Template:1                        | ISO/IEC 29341-20-4       |
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| UPnP TelephonyServer:2 Device                           | ISO/IEC 29341-26-3       |
| UPnP Friendly Info Update:1 Service                     | ISO/IEC 29341-27-1       |
| UPnP MultiScreen MultiScreen Architecture:1             | ISO/IEC 29341-28-1       |
| UPnP MultiScreen Application Management:1 Service       | ISO/IEC 29341-28-10      |
| UPnP MultiScreen Screen:1 Device                        | ISO/IEC 29341-28-2       |
| UPnP MultiScreen Application Management:2 Service       | ISO/IEC 29341-29-10      |
| UPnP MultiScreen Screen:2 Device                        | ISO/IEC 29341-29-2       |
| UPnP IoT Management and Control Architecture Overview:1 | ISO/IEC 29341-30-1       |

|                                                             |                     |
|-------------------------------------------------------------|---------------------|
| UPnP DataStore:1 Service                                    | ISO/IEC 29341-30-10 |
| UPnP IoT Management and Control Data Model:1 Service        | ISO/IEC 29341-30-11 |
| UPnP IoT Management and Control Transport Generic:1 Service | ISO/IEC 29341-30-12 |
| UPnP IoT Management and Control:1 Device                    | ISO/IEC 29341-30-2  |
| UPnP Energy Management:1 Service                            | ISO/IEC 29341-31-1  |



## 1 Scope

This service template is compliant with the UPnP Device Architecture version 1.0 [14]. It defines a service type referred to herein as RenderingControl.

### 1.1 Introduction

Most rendering devices contain a number of dynamically configurable attributes that affect how the current content is rendered. For example, video rendering devices, such as TVs, allow user control of display characteristics such as brightness and contrast, whereas audio rendering devices allow control of audio characteristics such as volume, balance, equalizer settings, etc. The RenderingControl service is intended to provide control points with the ability to query and/or adjust any rendering attribute that the device supports.

The RenderingControl service enables a control point to:

- a) Discover the set of attributes supported by the device.
- b) Retrieve the current setting of any supported attribute
- c) Change the setting of (that is: control) any modifiable attribute
- d) Perform a set of content transforms, which, in addition to the above, also enables functionality for selecting content depended options, for example:
  - 1) Selecting a specific sub-stream in a composite stream for rendering.
  - 2) Turning subtitling on or off.
- e) Restore the settings defined by a named Preset

The RenderingControl service does not:

- a) Control the flow of the associated content (for example, Play, Stop, Pause, Seek, etc.).
- b) Provide a mechanism to enumerate locally stored content.
- c) Provide a mechanism to send content to another device (via the home network or direct connection).

### 1.2 Multi-input Devices

Some high-end AV device are capable of receiving multiple pieces of content at the same time and combining that content together so that it can be rendered together using a single set of output hardware. For example, while displaying a TV program, high-end TVs can also display additional content (for example, VCR content) in a PIP (Picture-In-Picture) window. Similarly, a Karaoke machine can mix together the background music with a singer's voice so that both sounds are played together on the same set of speakers.

As with all devices, the RenderingControl service allows a control point to adjust the output characteristics of the post-mixed content before it is actually rendered. However, in many cases, control points may need to control the output characteristics of the individual input content before it is mixed together with the other input content. In order to support this, the RenderingControl service includes an *InstanceID* argument with each action that allows the control point to identify on which content the action is to be applied (for example, the post-mixed content or one of the pre-mixed input content items).

By convention, an *InstanceID* of 0 indicates that the invoked action shall be applied to the post-mixed content. Similarly, each pre-mixed input content is assigned a unique *InstanceID* whose value is a non-zero, positive integer. Refer to Annex A for additional information.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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